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23373 7590 11/18/2008

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER

HUNG, YUBIN

ART UNIT

PAPER NUMBER

2624

DATE MAILED: 11/18/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,176	09/24/2003	Tatsunhide Tsuyuki	Q77300	4041

TITLE OF INVENTION: IMAGE PROCESSING APPARATUS, METHOD, AND STORAGE MEDIUM FOR REMOVING NOISE FROM STEREOSCOPIC IMAGE PAIR

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	02/18/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE** OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

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B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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23373 7590 11/18/2008

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
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WASHINGTON, DC 20037

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,176	09/24/2003	Tatsuhide Tsuyuki	Q77300	4041

TITLE OF INVENTION: IMAGE PROCESSING APPARATUS, METHOD, AND STORAGE MEDIUM FOR REMOVING NOISE FROM STEREOSCOPIC IMAGE PAIR

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	02/18/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
HUNG, YUBIN	2624	382-167000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____
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This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			HUNG, YUBIN	
			ART UNIT	PAPER NUMBER
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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 777 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 777 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability

Application No.

10/668,176

Examiner

YUBIN HUNG

Applicant(s)

TSUYUKI ET AL.

Art Unit

2624

- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE filed on 9/15/08.
2. ☒ The allowed claim(s) is/are 1, 2, 7-16 and 18-21 (re-numbered as claims 1-16).
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☒ Other Appendix A.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/15/08 has been entered.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a communication with Applicant's representative Mr. Dion R. Ferguson on 11/12/08.

3. The application has been amended as follows:

3.1 Replace the title with the following:

"Image Processing Apparatus, Method, and Storage Medium for Removing Noise from Stereoscopic Image Pair"

3.2 Replace ALL the claims with the following:

1. An image processing apparatus comprising:

one or more storage units for storing pairs of images formed to generate a difference corresponding to a parallax of both eyes;

a processing unit coupled to said one or more storage units which, in a selected pair of images stored in said storage units, performs a process of reducing a difference of at least one of the selected pair of images other than a geometric difference between image structures corresponding to the parallax of both eyes;

wherein the difference other than the geometric difference between the image structures corresponding to the parallax of both eyes is a difference between noise components superposed on the selected pair of images; and

wherein the reducing a difference between noise components comprises using a least-squares method, the least-squares method determining a minimizing constant that minimizes a residual between (1) an average data function plus a constant and (2) a data function over a region of one of the selected pair of images, and setting each pixel in said region to have the value of the average data function at said each pixel plus the minimizing constant;

wherein said average function is determined based on the selected pair of images.

2. An image processing apparatus according to claim 1, wherein the selected pair of images are still images picked from a pair of video images formed to generate a difference corresponding to a parallax of both eyes.

3-6. (canceled).

7. An image processing apparatus according to claim 1, further comprising a recognition unit which recognizes the geometric difference between image structures corresponding to the parallax of both eyes in the selected pair of images, wherein

the processing unit performs a process of reducing a difference other than the geometric difference between the image structures recognized by the recognition unit in the selected pair of images.

8. An image processing apparatus according to claim 7, wherein the recognition unit recognizes the geometric difference between the image structures corresponding to the parallax of both eyes by performing matching between the selected pair of images.

9. An image processing apparatus according to claim 1, wherein the processing unit performs, as the process of reducing the difference other than the geometric difference between the image structures, at least one of a process of removing a noise component superposed on only one of the selected pair of images from the one image or a process of correcting at least one of the selected pair of images to eliminate or reduce a difference between noise components

which are different from each other and superposed on corresponding regions on the selected pair of images.

10. An image processing apparatus according to claim 7, wherein the processing unit divides each of the selected pair of images into sectional regions, determines, for a specific sectional region of one of the selected pair of images, a corresponding sectional region of the other image in the selected pair based on the geometric difference between image structures in the selected pair of images recognized by the recognition unit, and compares the two corresponding sectional regions with each other, so that a noise component which causes the difference other than the geometric difference between the image structures is determined.

11. An image processing apparatus according to claim 9, wherein the processing unit averages the noise components which are different from each other and superposed on the corresponding regions on the selected pair of images, and corrects at least one of the selected pair of images based on the averaged noise component.

12. An image processing apparatus according to claim 1, wherein the selected pair of images are digital images obtained by photographing the same scene by a plurality of image pickup devices, relative positions of which are adjusted to generate the difference corresponding to a parallax of both eyes, or by photographing the same scene at a plurality of positions to which a single image pickup device is sequentially moved to generate the difference corresponding to a parallax of both eyes.

13. An image processing method comprising:

using a computer to perform a process of:

reducing a difference of at least one of a pair of images corresponding to a parallax of both eyes, said difference is other than a geometric difference between image structures corresponding to said parallax of both eyes;

wherein the difference other than the geometric difference between the image structures corresponding to the parallax of both eyes is a difference between noise components superposed on the selected pair of images; and

wherein the reducing a difference comprises using a least-squares method, the least-squares method determining a minimizing constant that minimizes a residual between (1) an average data function plus a constant and (2) a data function over a region of one of the selected pair of images, and setting each pixel in said region to have the value of the average data function at said each pixel plus the minimizing constant;

wherein said average function is determined based on the selected pair of images.

14. A computer readable storage medium which stores a computer program for causing a computer to function as a processing unit which, in a pair of images formed to generate a difference corresponding to a parallax of both eyes, performs a process of reducing a difference of at least one of the pair of images other than a geometric difference between image structures corresponding to the parallax of both eyes;

wherein the difference other than the geometric difference between the image structures corresponding to the parallax of both eyes is a difference between noise components superposed on the pair of images; and

wherein the reducing a difference comprises using a least-squares method, the least-squares method determining a minimizing constant that minimizes a residual between (1) an average data function plus a constant and (2) a data function over a region of one of the selected pair of images, and setting each pixel in said region to have the value of the average data function at said each pixel plus the minimizing constant;

wherein said average function is determined based on the selected pair of images.

15. An image processing apparatus according to claim 1, wherein the reducing a difference reduces a difference between image structures corresponding to the parallax of both eyes which is not a geometric difference.

16. An image processing apparatus according to claim 1, wherein the reducing difference between noise components superposed on the selected pair of images comprises:

determining an averaged noise component for the selected pair of images; and

correcting the noise component in each image of the selected pair of images according to the averaged noise component.

17. (canceled).

18. An image processing method according to claim 13, wherein the reducing difference between noise components superposed on the selected pair of images comprises:

determining an averaged noise component for the selected pair of images; and

correcting the noise component in each image of the selected pair of images according to the averaged noise component.

19. An image processing method according to claim 13, wherein the difference other than the geometric difference between the image structures corresponding to the parallax of both eyes is a difference between colors in the selected pair of images.

20. An image processing apparatus according to claim 1, wherein the selected pair of images comprises a left image and a right image, and the process for reducing the difference of at least one of the pair of images further comprises:

sectioning each of the left image and the right image into a plurality of process blocks, wherein each process block of the left image correspond to a process block of the right image, and each process block for the left image and each process block for the right image comprising a plurality of pixels;

for each pair of corresponding process blocks, perform the following operations:

calculating an average data function based on the left process block and the right process block;

calculating a left minimizing constant and a right minimizing constant using a least squares method that minimizes a left residual between (1) the average data function plus a

constant and (2) a data function at each of the pixels contained within the left process block, and a right residual between (3) the average data function plus a constant and (4) a data function of the pixels contained within the right process block, respectively;

setting the data function at each pixel of the left process block to equal the average data function at said each pixel of the left process block plus the left minimizing constant;

setting the data function at each pixel of the right process block to equal the average data function at said each pixel of the right process block plus the right minimizing constant.

21. An image processing apparatus according to claim 20, wherein the average data function is calculated according to the following equation:

$$f_{ave}(j) = \frac{1}{2n} \cdot \left(\sum_{i=1}^n data_{L_i}(i, j) + \sum_{i=1}^n data_{R_i}(i, j) \right)$$

where, $data_{L_i}(i, j)$ is the pixel at the i th row and the j th column in a process block of the left image, $data_{R_i}(i, j)$ is the pixel at the i th row and the j th column in the process block of the right image that corresponds to the first process block, and n is the total number of pixels in each process block for the left image and right image.

Allowable Subject Matter

4. Claims 1, 2, 7-16 and 18-21 (re-numbered as claims 1-16) as amended are allowed.
5. The following is an examiner's statement of reasons for allowance:

Regarding independent claim 1, and similarly claims 13 and 14, closest art of record, alone or in combination, does not disclose, teach or fairly suggest at least reducing the noise difference using a least-squares method in the manner as set forth in the claim.

6. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to YUBIN HUNG whose telephone number is (571)272-7451. The examiner can normally be reached on 7:30 - 4:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh M. Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yubin Hung/
Primary Examiner, Art Unit 2624
November 14, 2008

Appendix A: Marked-up Examiner's Amendment

1. (currently amended): An image processing apparatus comprising:

~~one or more storage units for storing pairs of images formed to generate a difference corresponding to a parallax of both eyes;~~

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a processing unit ~~coupled to said one or more storage units~~ which, in a ~~selected pair of images stored in said storage units~~, performs a process of reducing a difference of at least one of the ~~selected~~ pair of images other than a geometric difference between image structures corresponding to the parallax of both eyes;

Deleted: formed to generate a difference corresponding to a parallax of both eyes

wherein the difference other than the geometric difference between the image structures corresponding to the parallax of both eyes is a difference between noise components superposed on the ~~selected~~ pair of images; and

wherein the reducing a difference between noise components ~~comprises using a least-squares method, the least-squares method determining a minimizing constant that minimizes a residual between (1) an average data function plus a constant and (2) a data function over a region of one of the selected pair of images, and setting each pixel in said region to have the value of the average data function at said each pixel plus the minimizing constant;~~
~~wherein said average function is determined based on the selected pair of images.~~

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2. (currently amended): An image processing apparatus according to claim 1, wherein

the ~~selected~~ pair of images are still images picked from a pair of video images formed to generate a difference corresponding to a parallax of both eyes.

3-6. (canceled).

7. (currently amended): An image processing apparatus according to claim 1, further comprising a recognition unit which recognizes the geometric difference between image structures corresponding to the parallax of both eyes in the selected pair of images, wherein the processing unit performs a process of reducing a difference other than the geometric difference between the image structures recognized by the recognition unit in the selected pair of images.

8. (currently amended): An image processing apparatus according to claim 7, wherein the recognition unit recognizes the geometric difference between the image structures corresponding to the parallax of both eyes by performing matching between the selected pair of images.

9. (currently amended): An image processing apparatus according to claim 1, wherein the processing unit performs, as the process of reducing the difference other than the geometric difference between the image structures, at least one of a process of removing a noise component superposed on only one of the selected pair of images from the one image or a process of correcting at least one of the selected pair of images to eliminate or reduce a difference between noise components which are different from each other and superposed on corresponding regions on the selected pair of images.

10. (currently amended): An image processing apparatus according to claim 7, wherein the processing unit divides each of the selected pair of images into sectional regions, determines, for a specific sectional region of one of the selected pair of images, a corresponding sectional region of the other image in the selected pair based on the geometric difference between image structures in the selected pair of images recognized by the recognition unit, and compares the two corresponding sectional regions with each other, so that a noise component which causes the difference other than the geometric difference between the image structures is determined.

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11. (currently amended): An image processing apparatus according to claim 9, wherein the processing unit averages the noise components which are different from each other and superposed on the corresponding regions on the selected pair of images, and corrects at least one of the selected pair of images based on the averaged noise component.

12. (currently amended): An image processing apparatus according to claim 1, wherein the selected pair of images are digital images obtained by photographing the same scene by a plurality of image pickup devices, relative positions of which are adjusted to generate the difference corresponding to a parallax of both eyes, or by photographing the same scene at a plurality of positions to which a single image pickup device is sequentially moved to generate the difference corresponding to a parallax of both eyes.

13. (currently amended): An image processing method comprising:

using a computer to perform a process of:

reducing a difference of at least one of a pair of images corresponding to a parallax of both eyes, said difference is other than a geometric difference between image structures corresponding to said parallax of both eyes;

wherein the difference other than the geometric difference between the image structures corresponding to the parallax of both eyes is a difference between noise components superposed on the selected pair of images; and

wherein the reducing a difference comprises using a least-squares method, the least-squares method determining a minimizing constant that minimizes a residual between (1) an average data function plus a constant and (2) a data function over a region of one of the selected pair of images, and setting each pixel in said region to have the value of the average data function at said each pixel plus the minimizing constant;

wherein said average function is determined based on the selected pair of images.

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14. (currently amended): A computer readable storage medium which stores a computer program for causing a computer to function as a processing unit which, in a pair of images formed to generate a difference corresponding to a parallax of both eyes, performs a process of reducing a difference of at least one of the pair of images other than a geometric difference between image structures corresponding to the parallax of both eyes;

wherein the difference other than the geometric difference between the image structures corresponding to the parallax of both eyes is a difference between noise components superposed on the pair of images; and

wherein the reducing a difference comprises using a least-squares method, the least-squares method determining a ~~minimizing constant that minimizes a residual between (1) an~~ average data function plus a constant and ~~(2) a data function over a region of one of the selected~~ pair of images, and setting ~~each pixel in said region~~ to have the value of the average data function ~~at said each pixel plus the minimizing constant~~.

~~wherein said average function is determined based on the selected pair of images.~~

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15. (previously presented): An image processing apparatus according to claim 1, wherein the reducing a difference reduces a difference between image structures corresponding to the parallax of both eyes which is not a geometric difference.

16. (currently amended): An image processing apparatus according to claim 1, wherein the reducing difference between noise components superposed on the selected pair of images comprises:

determining an averaged noise component for the selected pair of images; and

correcting the noise component in each image of the selected pair of images according to the averaged noise component.

17. (canceled).

18. (currently amended): An image processing method according to claim 13, wherein the reducing difference between noise components superposed on the selected pair of images comprises:

determining an averaged noise component for the selected pair of images; and
correcting the noise component in each image of the selected pair of images according to the averaged noise component.

19. (currently amended): An image processing method according to claim 13, wherein the difference other than the geometric difference between the image structures corresponding to the parallax of both eyes is a difference between colors in the selected pair of images.

20. (currently amended): An image processing apparatus according to claim 1, wherein the selected pair of images comprises a left image and a right image, and the process for reducing the difference of at least one of the pair of images further comprises:

sectioning each of the left image and the right image into a plurality of process blocks, wherein each process block of the left image correspond to a process block of the right image, and each process block for the left image and each process block for the right image comprising a plurality of pixels;

for each pair of corresponding process blocks, perform the following operations:
calculating an average data function based on the left process block and the right process block;

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calculating a left minimizing constant and a right minimizing constant using a least squares method that minimizes a left residual between (1) the average data function plus a constant and (2) a data function at each of the pixels contained within the left process block, and a right residual between (3) the average data function plus a constant and (4) a data function of the pixels contained within the right process block, respectively;

setting the data function at each pixel of the left process block to equal the average data function at said each pixel of the left process block plus the left minimizing constant;

setting the data function at each pixel of the right process block to equal the average data function at said each pixel of the right process block plus the right minimizing constant;

21. (currently amended): An image processing apparatus according to claim 20, wherein the average data function is calculated according to the following equation:

$$f_{ave}(j) = \frac{1}{2n} \cdot \left(\sum_{i=1}^n \text{data}_L(i, j) + \sum_{i=1}^n \text{data}_R(i, j) \right)$$

where, $\text{data}_L(i, j)$ is the pixel at the i th row and the j th column in a process block of the left image, $\text{data}_R(i, j)$ is the pixel at the i th row and the j th column in the process block of the right image that corresponds to the first process block, and n is the total number of pixels in each process block for the left image and right image.

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repeating the operations for each of the remaining process blocks of the left image and right image

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